

The prior Action of 3/19/08 in regard to claim 2 had made no finding of any yaw control surfaces on the “wing” or “larger lifting” surface, in any reference. The limitation of claim 2 had not been addressed. Thus, applicant’s amendment to claim 2 did not necessitate the new ground of rejection. Rather the Examiner’s amendment corrected a prior oversight of not citing any reference in rejection of the claim.

### §112 Rejections

#### Claim 1 – “Large Objects”

The Examiner rejects claim 1 as indefinite, finding “large objects” vague and queries what does “large” mean, or what qualifies an object as “large.” The Examiner further asserts (page 3 of the Action) that the term “large” is relative.

In response claims 1, 6 and 11 have been amended herein to address this issue, in regard to a “large opening at the rear of the fuselage,” “large objects” which can be loaded therethrough and the “relative nature” of “large.”

Claim 1 has been amended to refer to a “personal aircraft,” as does the only other independent claim, claim 11, and as did the dependent claims 1/6, 1/2/6, 3/6 and 2/4/6. (The specification refers to “personal” aircraft in multiple places, including paragraphs 2, 15, 16 and 17. Personal aircraft is defined in paragraph 26. E.g. a personal aircraft refers to an aircraft designed for six or less occupants and with a gross weight limit of 5000 pounds and a horsepower of less than or equal to 500 hp.) By this amendment applicant renders the terms “large objects” and a “large opening” in all of the claims more definite by limiting the size of the craft, to begin with, to that of a personal aircraft or smaller. Such addresses the relative nature of “large.”

The specification refers alternately to “large objects” and to “bulky items.” E.g. “bulky items” are discussed in paragraphs 2, 3 and 8. “Large objects” are discussed in paragraph 11, and exemplified therein:

“Large objects” for a personal aircraft could refer to such things as a patient on a gurney, a man in a wheelchair, a coffin (aka a casket), a motorcycle, a four-wheeled vehicle such as a golf cart or ATV, a sheet of plywood, etc., any of which could be carried by a typical small private plane, under its volume and weight limitations, if only it could be loaded aboard, which is not possible with conventional personal aircraft designs. (paragraph [0011])

In light of the exemplary “large objects,” applicant quantifies the “large opening” as an opening at least four feet high and three feet wide. Considerations of the size of a patient on a gurney, a man in a wheelchair and a motorcycle indicate an opening at least 4 feet high and 3 feet wide. Claims 1 and 11 are amended accordingly.

The preferred embodiment of Figure 1A illustrates a modular container 24. Paragraph 17 recites that the design shown utilizes a modular cargo container 10 feet by 4 feet by 5 feet, although such is not necessary to the design. Claim 6 as amended further recites a preferred opening of at least 5 feet high and 4 feet wide.

Applicant submits that the amended claims satisfy the definiteness requirement, e.g. by limiting the maximum size of the aircraft and the minimum size of the “large” opening relative thereto.

#### Claim 12

Applicant has amended claim 12 to recite that the aircraft of claim 11 includes power sources and yaw control surfaces and where all said sources and surfaces are attached to the aircraft at a location at least as far forward as the larger lifting surface. Applicant submits that such amendment clarifies any indefiniteness found by the Examiner and comports with the Examiner’s interpretation of claim 12 in the body of the Action.

#### Rejections Under §103 Over Rutan ‘800 in view of Rutan ATTT, - Claims 1, 3-6 and 8-12.

Applicant respectfully traverses the rejections under §103 over Rutan ‘800 in view of Rutan ATTT.

#### Summary re Rutan ‘800

The Rutan ‘800 is not absent an empennage, as the Examiner asserts. As the Rutan ‘800 teaches, column 4, lines 36-51, the design is lacking a “conventional empennage,” but it has a novel empennage, e.g. the fin 26 extending vertically downward at the aft end of the fuselage. (See discussion below and excerpted attached pages from IDS book, with text and figures.) Secondly, the Rutan ‘800 does not teach “a personal” aircraft as now recited by all claims, and as previously recited by claims 1/6, 1/2/6, 1/3/6 and 1/2/4/6 and 11. Rutan ‘800 teaches an aircraft approximately twice the size of a “personal” aircraft. Thirdly, the Rutan ‘800 as disclosed does not teach an aft end of the fuselage capable of accommodating a “large opening” at least 4 feet high and 3 feet wide. Such incapacity to accommodate a “large opening,” at least 4 feet high and 3 feet wide,” would be exacerbated by reducing the embodiment of the ‘800 down to the size of a “personal” aircraft. (See discussion below.)

#### Discussion in More Detail

Claim 1 recites that the cargo adapted aircraft is a “personal” aircraft, (as did previous dependent claims 1/6, 1/2/6, 1/3/6 and 1/2/4/6.) A “personal” aircraft is defined in the instant specification in paragraph [0026.] The Rutan ‘800 does not disclose a personal aircraft as defined in the instant specification, i.e. an aircraft designed for 6 or less occupants, with a gross weight limit of 5,000 pounds and a horsepower of less or equal to 500 hp. Rather, the Rutan ‘800 discloses an embodiment with an average cruise gross weight of 11,000 pounds, (column 7 lines 42-43) and with a fuselage of 45.5 feet in length (column 7 lines 61-62 and Figures 3 and 6.) Rutan discloses a load consisting of a pilot and a full

passenger compartment containing 8 passengers (column 8 lines 5-6.) One can posit that the Rutan's design would have to be scaled down 50% to come within the ballpark of a "personal" aircraft.

Reviewing the design of Rutan '800's Figure 3, if the craft as portrayed were approximately 45.5 feet long, the fuselage at the end of the sweptback wing would be only about 2.5 feet wide. Even without scaling Rutan's design down to a "personal" aircraft size, if the Rutan '800 were to provide an opening at the rear of the fuselage of at least 4 feet high and 3 feet wide, the fuselage would have to be widened and portions of the sweptback wing would need to be reduced. The engines 18 would have to be moved laterally outwardly on the wing, sacrificing the axially centered thrust feature of the pair of engines located on each side of the fuselage (as Rutan discloses on column 4 line 36) and creating asymmetrical thrust issues with potentially off-balance de-stabilizing torquing (see attached book page 166, column 2, – lines 1-2.) Also importantly, the extendable elements 24, which are the heart of the Rutan '800 invention, would have to be reduced in size, apparently by about 1/3 for a "personal" sized aircraft, arguably destroying the actual Rutan '800 invention. Thus, if the Rutan '800 design were scaled down to the "personal" aircraft size and a 4x3 rear door were added, not only would (1) the shape of the sweptback wings have to be significantly changed; (2) the width and shape of the fuselage have to be significantly changed; (3) a significant reduction have to be effected in the relative size of element 24; but also (4) the location of the engines would have to be moved significantly out from the fuselage. These changes would significantly impact the locations of the center of gravity and neutral point, as charted in Rutan's Figure 6. At the least such modified craft, were there any motivation to so selectively modify the '800, which applicant traverses, would have to be tested to see if, and how, it performed. Satisfactory flight could not be predicted by one of ordinary skill.

Applicant submits that there is no motivation to make such specific, selective modifications to the Rutan '800, absent hindsight, absent the blueprint of the instant application. Such changes are inimical to the teachings of the ATTT, also a Rutan design, with its boom supported empennage and three surface canard. No specific detailed reasoning is offered to support the motivation for making the Examiner's selective modifications of elements to reach applicant's invention, and for ignoring the Rutan ATTT teachings away from such modification. The evidence (previously submitted from the history of the development of the ATTT) shows that when Rutan himself, the source of the '800 design, added an aft loading capability to a canard, he specifically taught the necessity of adding a boom supported empennage and a three surface canard (See ATTT download history.)

#### Re Absence of an Empennage

The Examiner errs in regard to asserting an absence of an empennage in the Rutan '800. See Rutan column 4 lines 35 through 51. Rather, a novel empennage has been substituted for the "conventional empennage" by Rutan. The "conventional empennage group" comprises a conventional tail with horizontal flaps for pitch control, a vertical stabilizer and a vertically oriented rudder for yaw

control. Rutan eliminated the “conventional empennage” group in favor of not only a pair of winglets 20 located at the tips of the primary wing and extendable elements 24 on the primary wing but also a vertical fin 26 projecting downwardly from the aft of the fuselage. Column 4 lines 42-45. The vertical fin 26, added by Rutan as part of his novel empennage, not only acts as a vertical stabilizer but also as a skid to prevent propellers 28, located aft, from hitting the ground. Column 4 lines 45-51. Figure 2 illustrates the empennage fin 26.

To get a better view of the vertical fin 26, see the Beechcraft Starship, discussed on pages 165-169 and Figures 4-3a, 4-4 and 4-5 of the Canard, A Revolution in Flight book, previously submitted in an IDS (copy of pages attached hereto for easy reference.) The Beechcraft Starship is the Rutan ‘800, as one of ordinary skill recognizes. It is powered by two four bladed pusher propellers, is of length 45.5 feet, is of maximum takeoff weight of 12,500 pounds, and the aft wing flaps and the sweptback forward wing flaps sweep in concert. The two-pusher engines are placed close to the fuselage to reduce asymmetrical thrust, (see page 166, column 2, lines 1-2) and there is a downwardly directed vertical fin, clearly located on the empennage. That the vertical fin located downwardly on the empennage is discernable in Figure 4-3a, Figure 4-4 and in the lower Figure 4-5. Thus, the Rutan ‘800 not only (1) lacks a door at the rear of the fuselage; (2) presents an embodiment incompatible with an at least 4 x 3 foot door on the rear of the fuselage; (3) has twin pusher engines grouped closely on the fuselage with sweptback wings and elements 24 incompatible with a “large door” at the rear of the fuselage; but also (4) Rutan has an empennage, the downwardly projecting fin 26, located on the fuselage aft, which also acts as a skid to prevent the aft propellers from hitting the ground.

The Rutan ATTT teaches a rear door on the fuselage, but only in conjunction with a three surface canard having a boom supported empennage. The development history of the ATTT, previously submitted, explicitly teaches adding the boom supported empennage, and reasons therefore. Thus, a door at the end of the fuselage of a Rutan design entails incorporating a third horizontal lifting surface, a boom supported empennage. A person skilled in the art would understand the Rutan ATTT to teach that adding a rear door at the end of the fuselage necessitates adding a boom supported empennage.

The Examiner’s selection and combination of Rutan elements, thus, is not a simple substitution of one element for another, but rather requires a significant reconstruction of the first reference together with an ignoring of the teachings of the second reference. The history of the development of the Rutan ATTT lone is persuasive evidence that applicant’s combination of elements is contrary to the presumed wisdom of the prior art. Thus, the prior art teaches away from the Examiner’s selective combination. To summarize, one of skill in the art, presumed to be informed by the prior art as whole, is taught that the addition of a rear door on the fuselage of a canard requires a boom supported empennage, in effect, a three surface canard. The Rutan ‘800 teaches a two surface canard but with an empennage and with no room for a “large” rear door. It is applicant, by contrast, that claims a unique combination of elements

not taught or suggested in the prior art. Applicant's combination does not yield a predictable result, and rather is based upon the knowledge of test results.

Re Affiant Wood

Affiant Hershel James Wood's experience can be summarized as:

- by formal education –grounding in principles of engineering and physics
- by occupation – long association with entities that develop and test cutting edge flying aircraft
- by private vocation – long experience flying private aircraft and thus presumably knowing the benefits and shortcomings thereof; and
  - hands on experience with novel experimental aircraft and thus the principles of flight.

Mr. Wood (1) attests to a long felt need of private pilots for a private personal craft capable of easily loading and unloading "large objects," and (2) based on his education and experience, that no one has solved this problem.

Applicant submits that Mr. Wood is qualified to offer such opinion, e.g. on long felt and unmet need.

Applicant further attaches web pages that just came to applicant's attention, attesting further to the long felt and unmet need to be able to go "the last 5 miles" with a personal aircraft.


Reconsideration and further examination is respectfully requested.

Applicants have made a diligent effort to place the claims in condition for allowance. However, should there remain unresolved issues that require adverse action, it is respectfully requested that the Examiner telephone Sue Z. Shaper, Applicants' Attorney at 713 550 5710 so that such issues may be resolved as expeditiously as possible.

For these reasons, and in view of the above amendments, this application is now considered to be in condition for allowance and such action is earnestly solicited.

Respectfully Submitted,

11/21/08  
Date

  
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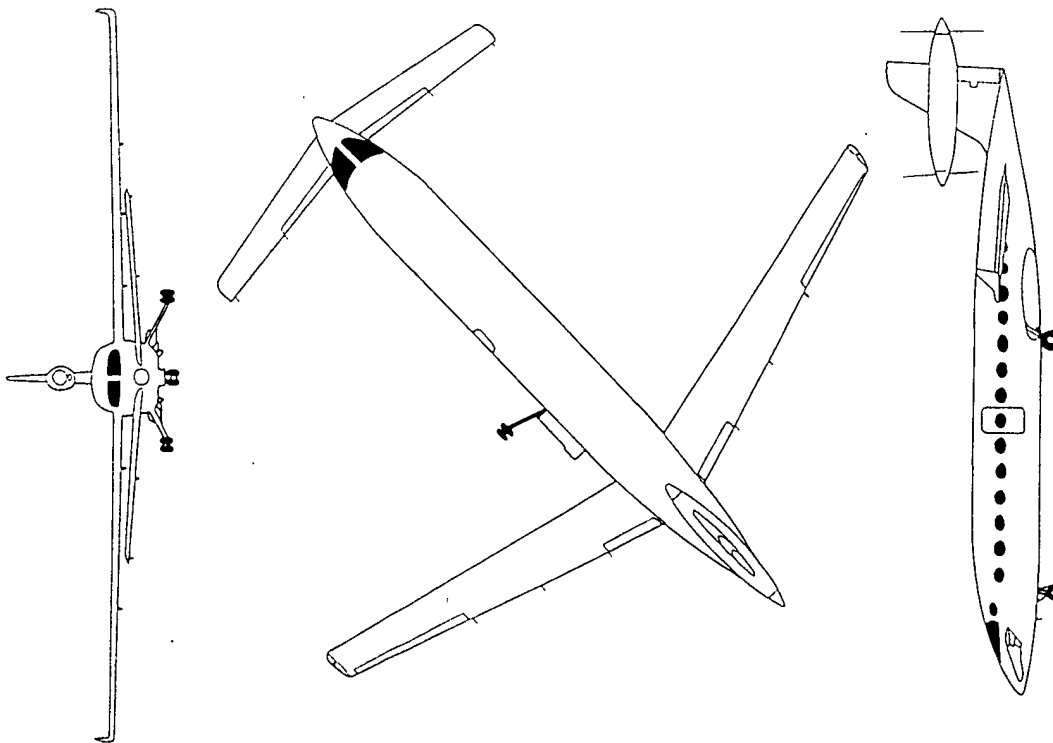


Fig. 4-1 Three view drawing of the Rutan Model 78-1 Commuter

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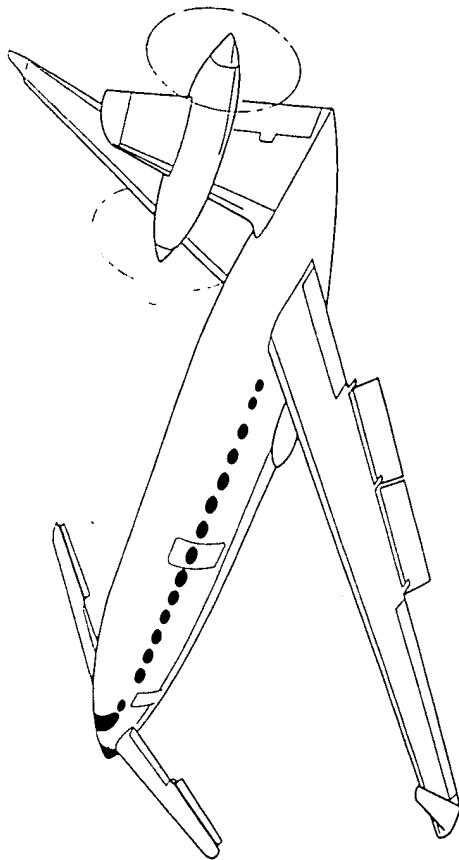


Fig. 4-2 Artist's rendition of the Rutan Model 78-1 Commuter. The forward sweeping aircraft, was intended to accommodate 36 passengers.

#### BEECHCRAFT STARSHIP I CORPORATE JET-FAN

Beech Aircraft Corp. is one of the oldest and most respected of the major U.S. general aviation manufacturing companies. While conservative in its developments, Beech has never shied away from the unconventional if there were sound reasons to do so. The pre-World War II "Stagger-wing" and the postwar "Bonanza," with its V-tail, are prime examples of that thinking. Nevertheless, adoption of a canard of advanced composite construction is a bold move that will challenge both the FAA and Beech engineers in its certification.

After initial studies of tandem wing pusher lay-outs, Beech invited Rutan to join in the study. Their joint efforts culminated in Rutan's SCALED Composites, Inc. construction of an 85% scale "proof-of-concept" flying prototype that began flight tests on August 29, 1983. At the National Business Aircraft Association's Convention in Dallas in October 1983, its flight demonstration

and, the showing of a full scale, non-flying mock-up, were the "hit" of the show.

Beech is now building six full scale airframes, including two for ground testing.

Beech's goals for the Starship I are:

- Higher operational speeds and altitudes than current business turboprop types.
- Improved fuel economy.
- Lower cabin noise levels.
- Stability in all flight regimes with no stall/spin.
- Less engine-out, off-center thrust problems.
- Pressurization of cabin, and more interior height and length.
- A docile, utilitarian and good field performance aircraft.

The Starship accommodates two pilots and nine passengers, a refreshment center, toilet, and two baggage compartments that are in-flight accessible.

It is to be powered by two Pratt and Whitney PT6A-60 turbo props flat rated to 1,000 shp each for takeoff, driving four bladed pusher propellers.

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Fig. 4-2. The aircraft made its first flight, powered all wing, on 27 October 1983.

Dimensions are span 51 feet 7 inches, length 15 feet 5 inches. It has a maximum takeoff weight of 11,500 pounds.

Performance figures include a cruising speed over 400 mph, initial rate of climb of 3,300 fpm, a ceiling of 41,000 feet, and a range of 2,070 miles with 45 minutes reserve.

The alt wing has two sets of Fowler flaps mounted on three external flap guides on each side. The swept back forward wing is interconnected to the flaps and sweeps forward when flaps are lowered, for slow, short landings.

The wing is very "Long-EZ" in plan, has large "up-sails" (wingtels) incorporating rudders for directional stability and control. The ailerons are "conventional" and antitails are by John Roney.

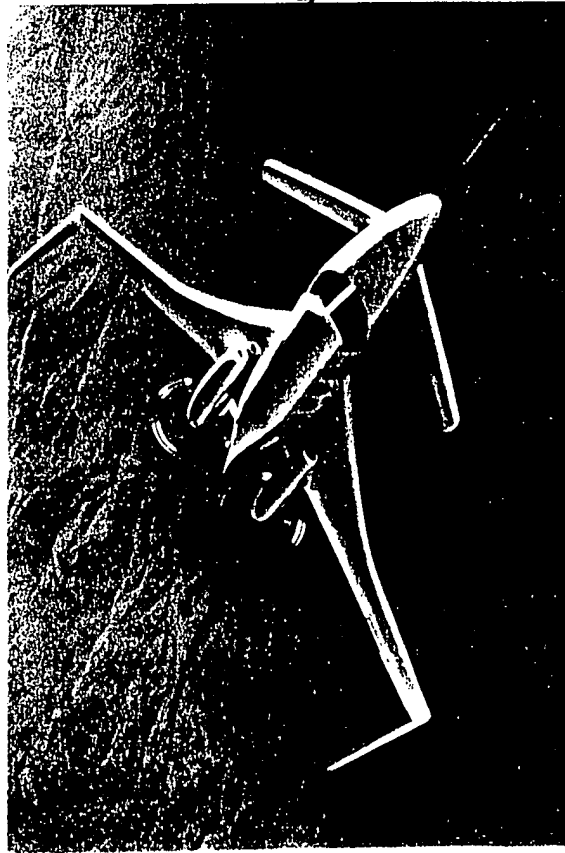


Fig. 4-3. Beechcraft Starship 1, in aviation world when they unveiled their incredibly beautiful Starship 1 in 1983. The Rutan described cockpit "features a variable sweep canopy that works in concert with the main wings' Fowler flaps, producing a high lift system without trim changes, or stalls in the Neutral Point. Each control is via Garrett elevator supplemented by airflow vanes, for extra lift from the ailerons.

Two pusher engines are spaced over the fuselage to induce circum and a symmetrical thrust. No large central fin is employed, but there is a small central fin and rudder. The dual main wheels retract inward into the wings, and the nose wheel retracts forward into the fuselage nose.

The flight deck will also be advanced design, with a Collins "all glass" panel incorporating CRT's for flight, navigation and performance monitoring systems. Single pilot operation certification is planned, despite provision of two seats and full dual controls.

The 85% of scale prototype is undergoing extensive flight testing at Mojave, California to provide Beech engineers with the design's flight characteristics before the full scale prototype flies.

That Beech would enlist the aid of Rutan's Scaled Composites, Inc. is, in itself, recognition that Burt Rutan has achieved the status of a lead-

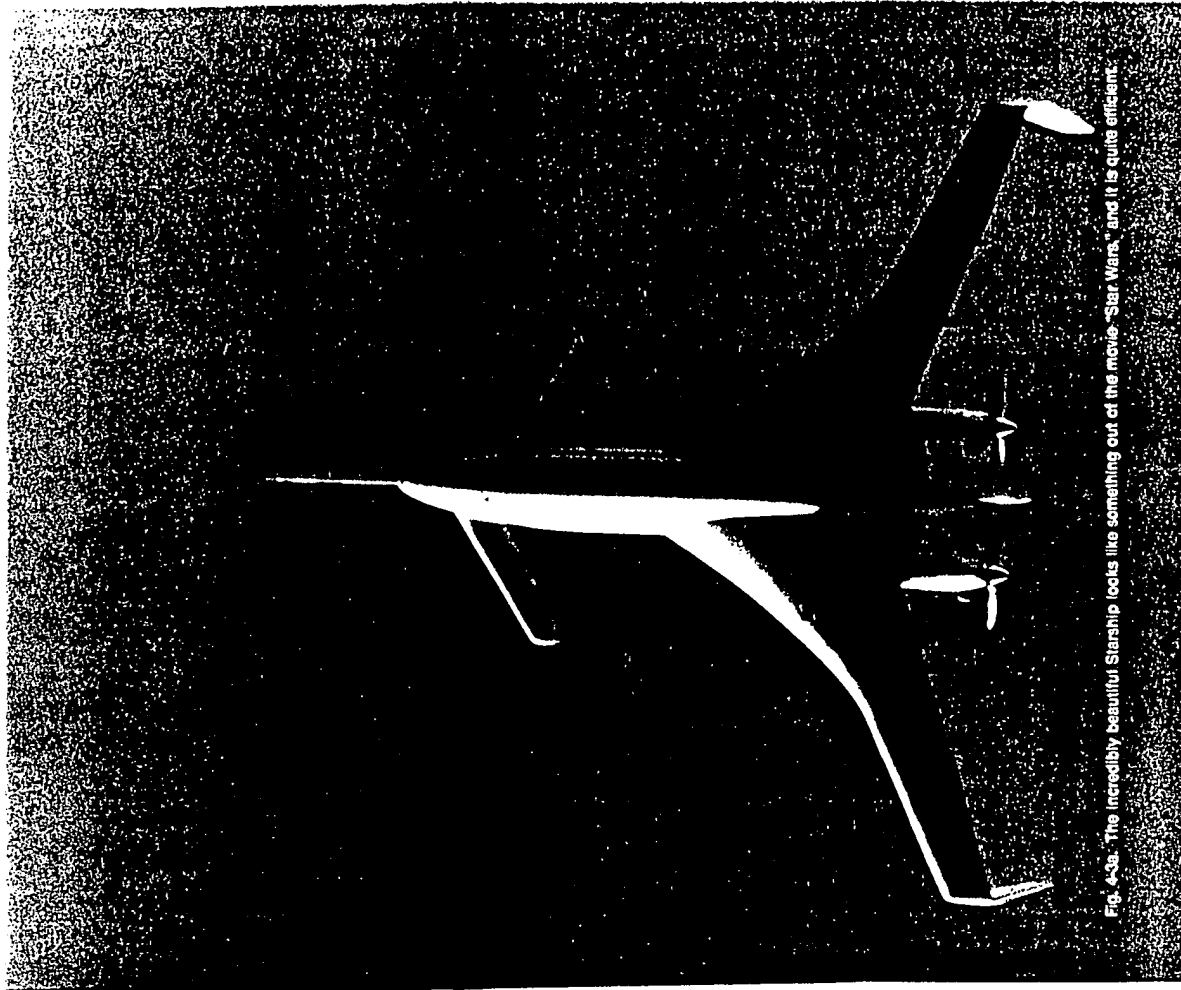


Fig. 4-3a. The incredibly beautiful Starship looks like something out of the movie "Star Wars," and it is quite efficient.

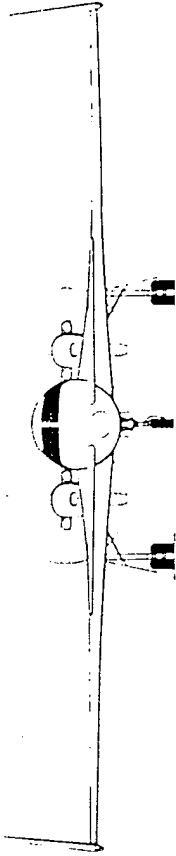


Fig. 4-4. The Starship 1, as seen in these photos, is actually an 85% scale flying prototype. With it, engineers gathered pertinent data on performance, stability and control, enabling them to better design the full scale version. It will carry two pilots and nine passengers.

The aircraft has a somewhat conventional appearance, is 34 feet in span, is 34 feet long, and is powered by two Pratt and Whitney 680 shp P16A-28 turboprop pusher engines, mounted in nacelles supported by short pylons over the wings. The propellers are Hartzell three-bladed constant-speed, full-feathering, reversible pitch pushers with Q-tips.

Fuel is carried in integral fuel tanks, 100 gallons in each wing and 40 gallons in, oddly enough, the foreplane. Fuel management in flight is automatic, maintaining the CG in its optimum location. In addition to the pilot, the aircraft will accommodate live to eight passengers.

Estimated performance figures are: a maximum speed of 425 mph, maximum cruise speed of 415 mph at 25,000 feet altitude, an economy cruise speed of 300 mph at 33,600 feet altitude, a service ceiling of 38,000 feet, full load range of 2,600

ing innovator and designer in world aviation— a well deserved accolade.

Beech management is recognized widely for the courage and foresight needed for this dramatic leap forward in configuration and technology. Beech Aircraft Corporation is a subsidiary of Raytheon Company.

AVTEK 400

The Avtek 400 could, humorously, be called the "DuPont Duck," being a canard (French for duck) and constructed of DuPont's Kevlar and Nomex composites, along with Dow Chemical resins.

It was first displayed in mock-up form at the 1983 Paris Air Show. Its composite structure permits an empty weight of only 3,100 pounds. Maximum takeoff weight is 5,800 pounds, or 77% of empty weight for payload.

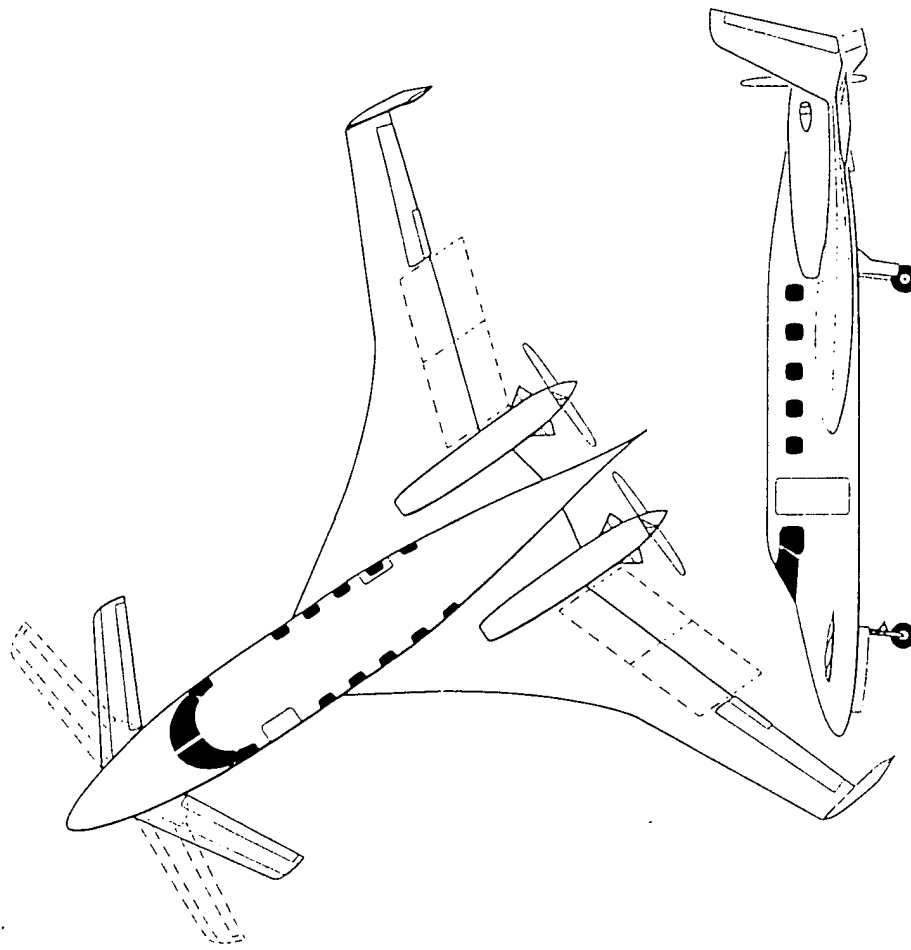
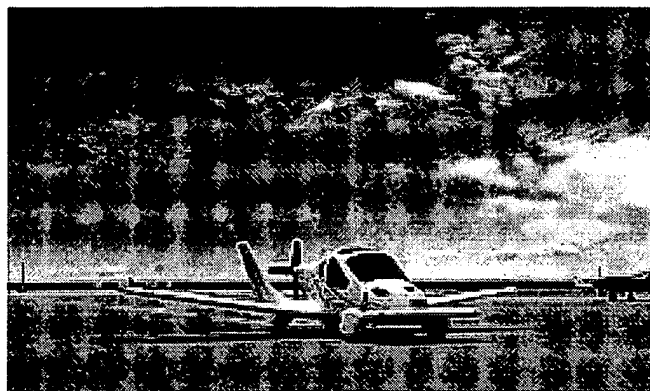


Fig. 4-5. Two views, drawing of the Starship 1, 85% scale flying prototype.

# AOPA Expo 2008 News

## Roadable airplane may fly next month

By Thomas B. Haines



[Terrafugia](#) CEO/CTO Carl Dietrich reported at AOPA Expo that the first Transition roadable airplane might fly in early December. If it doesn't fly by mid-December, the first flight will likely be postponed until early 2009.

The vehicle (Is it a car or an airplane?) has been driving around on its own power for several weeks and more recently is undergoing taxi tests and tests to validate the flight control effectiveness. Static load testing is complete.



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## New initiatives, new president

.....

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Dietrich said that while the \$194,000 vehicle will be able to drive at highway speed, it is not meant to replace a car in the family fleet. Instead it's a means of getting around on the ground when you land away from your home airport, and a convenient means of moving to and from your home airport for flights—allowing the vehicle to be garaged at home.

Powered by a Rotax engine, the aircraft is being designed to meet special light sport aircraft standards. It will cruise in the air at about 100 knots with a range of about 400 nm.

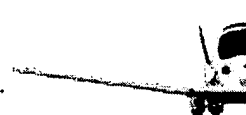
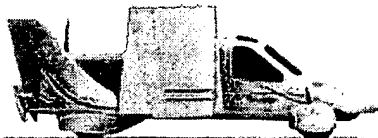


As for road safety, Dietrich reported that the Transition will meet automotive standards in most ways, but because of the cost of crash testing, the company won't be able to prove all of the safety features for some time. The Department of Transportation allows for low-volume automotive manufacturers to amortize the cost of such testing over a number of years if the manufacturer can show that the vehicle is built in a safe way and that a plan to prove its design through crash testing is in place. Terrafugia is applying for such an exemption. The vehicle will also need an EPA exemption for emissions, since the carbureted Rotax engine does not meet automotive emission standards. Again, Terrafugia is meeting with the agency to develop a plan for an exemption.

Once basic flight testing of the current model is complete, the company plans to design a production prototype early next year and build it during second half of 2009, with first deliveries planned for mid-2010.

November 7, 2008

# TERRAFUGIA®



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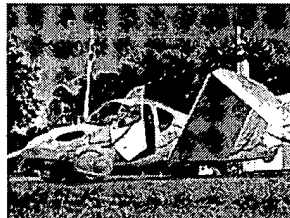
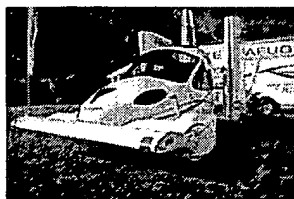
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## Introducing the Transition®

The Terrafugia Transition® Proof of Concept Vehicle made its debut at EAA AirVenture in Oshkosh, WI.

Click on the images below for a larger view:



**The Terrafugia Transition®** is a roadable Light Sport Aircraft designed by a team of award-winning MIT-trained engineers for today's demanding general aviation pilot.

Bring more flexibility and convenience to your flying. Keep your Transition® in your garage. Drive to your local airport, fly up to 400nm, land, convert, and drive directly to your destination. You'll always be ready to drive or fly.

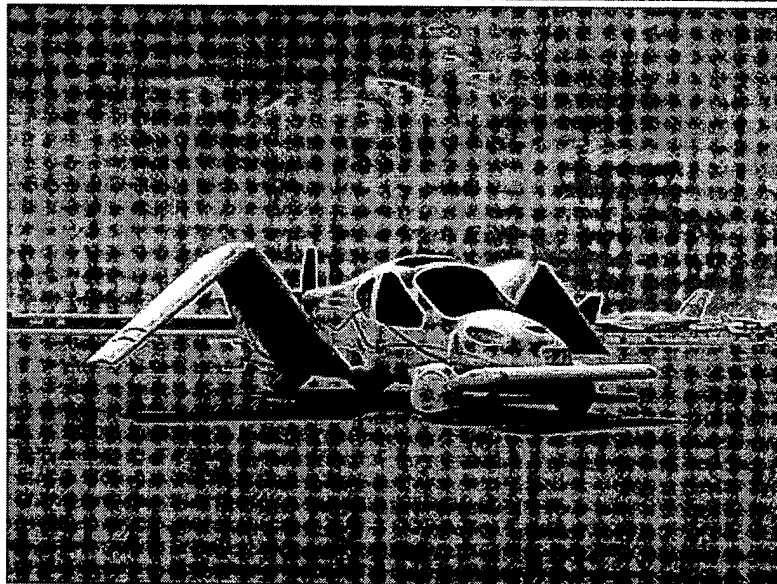
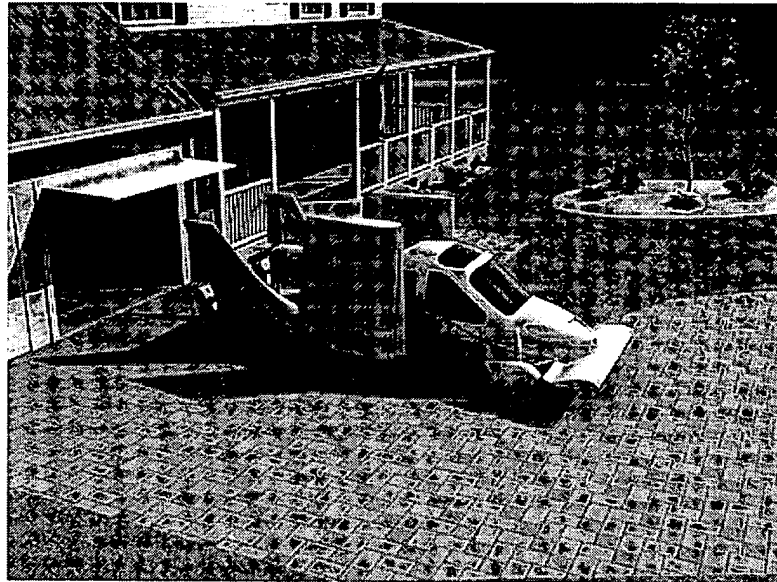
Converting from road to flight mode requires a few simple commands in the cockpit and a normal pre-flight. Transform back to a street legal vehicle without having to leave your seat.

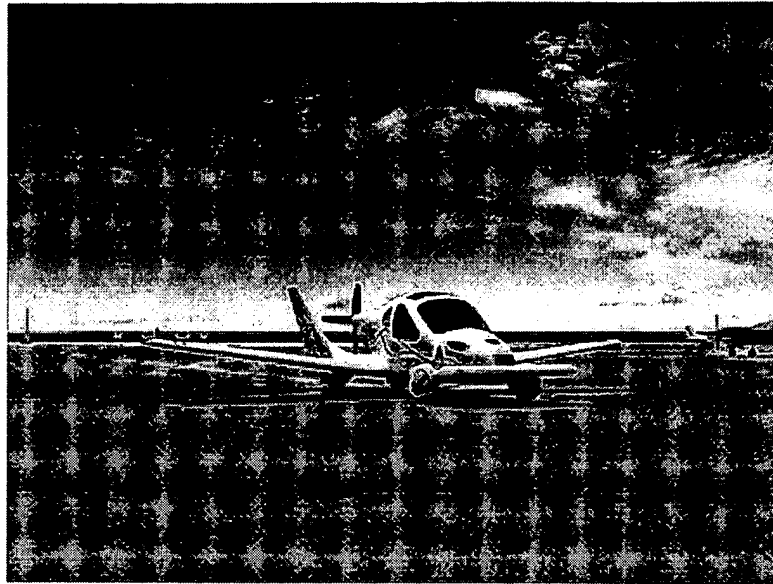
Never let questionable weather cancel or endanger your trip again. Simply divert and continue on the ground until the weather clears.

Designed to automotive crash safety standards, with an option for a full-vehicle parachute, Terrafugia's commitment to safety is apparent in the Transition's form as well as function.

Become part of the future of aviation today.

*Please follow the links on the left for more information and imagery.*





CG Images and animations were generated by:  
Benjamin Schweighart.

